July 19, 1938. H. FLEISHER 2,124,361

KNITTED PILE FABRIC

Original Filed Feb. 16, 1938 2 Sheets-Sheet 1

Fig.1.

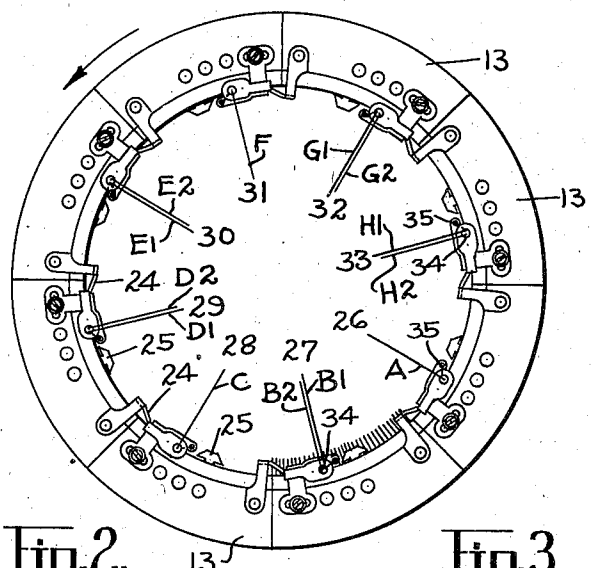


Fig.5.

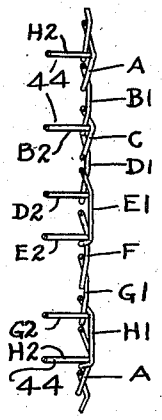


Fig.2.

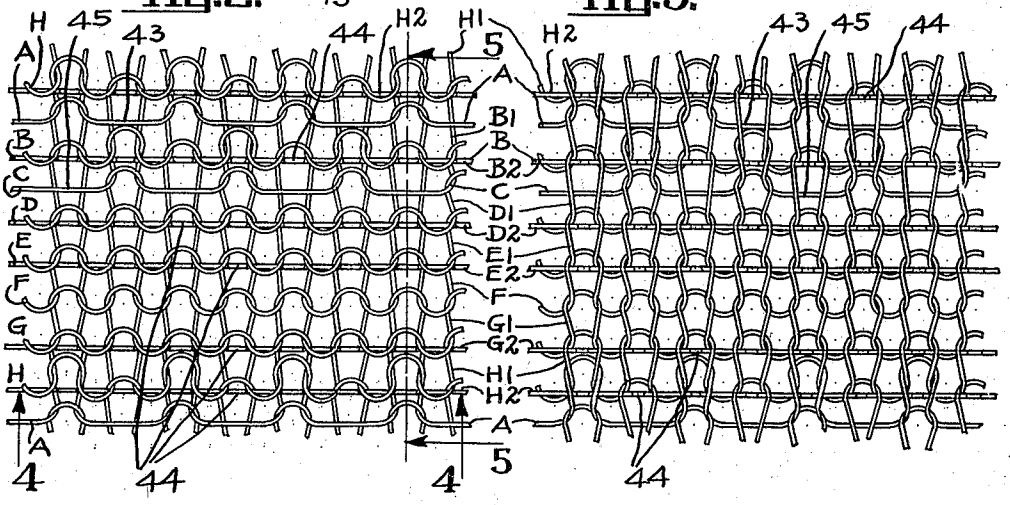
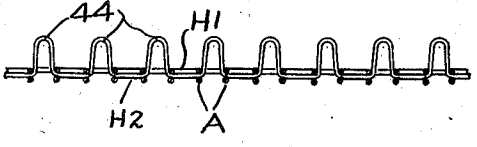


Fig.3.

Fig 4



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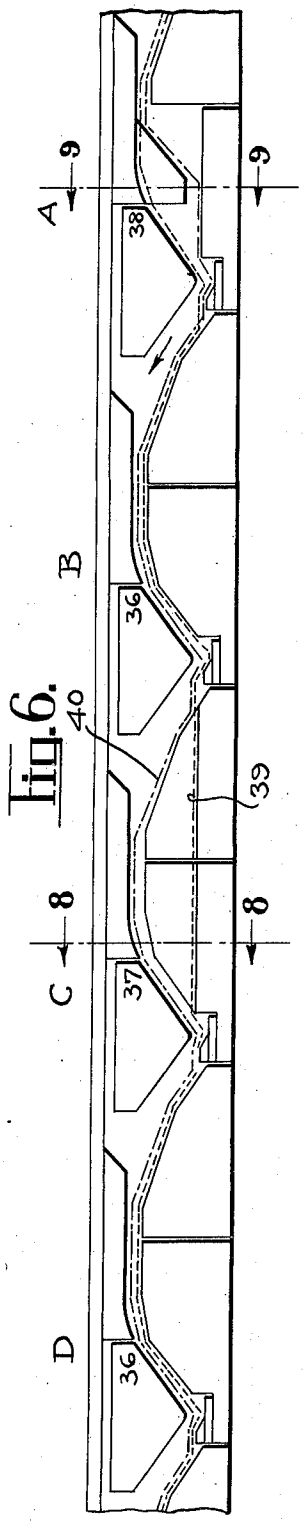


Fig. 6.

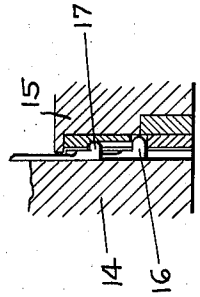


Fig. 9.

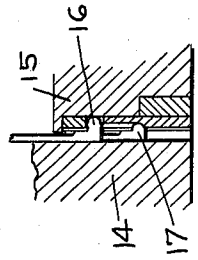


Fig. 8.

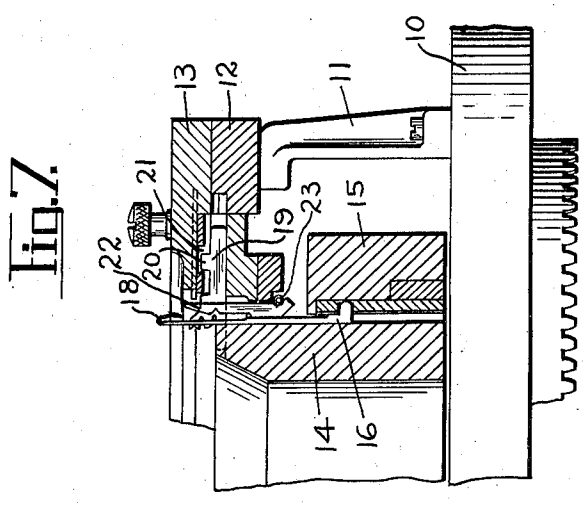


Fig. 7.

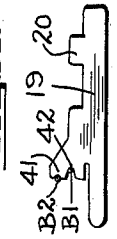


Fig. 11.

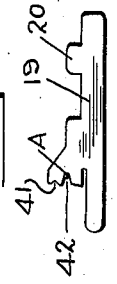


Fig. 10.

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UNITED STATES PATENT OFFICE

2,124,361

KNITTED PILE FABRIC

Harry Fleisher, Watertown, Conn., assignor to Princeton Inc., Watertown, Conn., a corporation of Connecticut

Application February 16, 1938, Serial No. 190,763
Renewed June 21, 1938

8 Claims. (Cl. 66—191)

This invention relates to knitted fabrics, and more particularly to a knitted pile fabric wherein the threads or yarns constituting the same are so arranged that the fabric is substantially run-resisting and is provided, in addition to the regular plain stitch, with loops extending outwardly from one surface forming a loop-pile which may be conveniently napped to give the fabric a woolly appearance.

One object of this invention is to provide a fabric of the above nature wherein all of the pile loops are substantially the same in length and are firmly retained in the fabric.

Another object is to provide a knitted pile fabric of the above nature having a new sequence of stitches including floats in combination with pile-loops.

A further object is to provide a knitted pile fabric of the above nature having a ribbed surface formed by the pile loops and which, after napping, possesses a ribbed woolly appearance.

A still further object is to provide an improved knitted pile fabric of the above nature which will be simple and easy to manufacture, flexible and elastic, non-crushable, substantially run-resisting, and very efficient and durable in use.

With these and other objects in view, there has been illustrated on the accompanying drawings one form in which the invention may be conveniently embodied in practice.

In the drawings:

Fig. 1 represents a diagrammatic plan view of a circular "eight-feed" knitting machine for producing the improved fabric.

Fig. 2 is an enlarged open view of the front surface of the improved knitted pile fabric embodying the principles and features of this invention.

Fig. 3 is a similar view of the reverse surface of the fabric.

Fig. 4 is a sectional view, taken on the line 4—4 of Fig. 2 through one of the courses of the fabric.

Fig. 5 is a sectional view, taken on the line 5—5 of Fig. 2 through one of the wales of the fabric.

Fig. 6 is a development view of a portion of the needle actuating cylinder cam.

Fig. 7 is an enlarged vertical sectional view of a portion of the knitting machine.

Fig. 8 is a sectional view of a portion of the needle actuating cam, taken on the line 8—8 of Fig. 6.

Fig. 9 is a sectional view of another portion of the needle actuating cam, taken on the line 9—9 of Fig. 6.

Fig. 10 is a detail view of the sinker used in forming the fabric, as it appears when engaging a single yarn for producing a stitch, without forming a pile-loop.

Fig. 11 is a detail view, similar to Fig. 10, showing the sinker as it appears when engaging two yarns,—one for producing a knitting stitch, and the other for forming a pile-loop.

One important advantage obtained by the novel arrangement of the threads or yarns in the improved knitted pile fabric herein disclosed is that said fabric may be made on an ordinary plain knitting machine without employing complicated mechanisms or special attachments,—it merely being necessary to use a new form of sinker and a suitable controlling cam therefor together with a needle-actuating cam cylinder arranged to produce floats at certain desired points.

Referring now to the drawings, wherein like reference numerals denote corresponding parts throughout the several views, the numeral 10 indicates a circular stationary base or table upon which a plurality of upstanding brackets 11 are mounted. The brackets 11 support a stationary ring member 12, which carries a plurality of horizontal arcuate plates 13 forming a segmental substantially circular sinker-operating cam member.

Provision is also made of a rotating needle-carrying cylinder 14 and a stationary annular needle-actuating cam cylinder 15, the latter being rigidly secured to the stationary table 10 in the usual manner and located below said stationary ring member 12. The rotary needle cylinder 14 carries a plurality of needles 16 and 17 which are adapted to be engaged by the stationary needle cam cylinder 15 to cause said needles to travel upwardly and downwardly during the operation of the machine. The needles 16 are of the type having long butts, while the needles 17 are of the type having short butts, and said long and short butt needles are arranged alternately around the circumference of the needle cylinder 14. Each of the needles 16 and 17 is provided at its upper end with the usual spring beard 18 which is adapted to catch the yarn on its downward stroke to form loops in carrying out the knitting action. Operating between the successive needles 16 and 17 are a series of horizontal sinkers 19, which are provided with substantially rectangular projections 20 on their upper edges adapted to travel within a horizontal cam groove 21 formed in the sinker-operating arcuate plates 13. The cam groove 21 serves to control

the outward and inward movement of the sinkers 19 at the proper times. The particular form of the sinkers 19 employed for forming the knitted pile fabric of this invention will be later described.

Provision is also made of a series of vertical pressers 22 which are adapted to close the spring beards 18 of the needles 16 and 17 when engaged by the beard-closing cams 25—one of which is located at each of the eight knitting points. In order to hold the pressers 22 away from the needles 16 and 17 at other times, provision is made of a circular coiled spring 23 which surrounds the lower notched ends of said pressers. In order to line up the pressers 22 just in advance of the knitting points, provision is made of a plurality of cams 24 (see Fig. 1), which serve to guide said pressers into such a position that they will close the beards 18 as the needles 16 and 17 move downwardly. At each knitting point, provision is made of a T-shaped cam 25 for pushing the pressers 22 against the beards 18 so that the latter will be closed as the needles move downwardly in making the loops or stitches.

For producing the improved fabric, the machine is provided with eight stations 26, 27, 28, 29, 30, 31, 32 and 33, to which thirteen threads or yarns are fed through guides 34 and 35 in the following order: one yarn to station 26, two yarns to station 27, one yarn to station 28, two yarns each to the stations 29 and 30, one yarn to station 31, and two yarns each to the stations 32 and 33.

A set of needle-actuating cams 36, 37 and 38 is provided on the cylinder 15 to control the up and down motion of the alternating long butt and short butt needles 16 and 17, respectively. Three different arrangements are employed as indicated in Fig. 6, wherein the dotted line 39 represents the movements of the long butt needles 16 and the dot and dash line 40 represents the movements of the short butt needles 17.

The sinkers 19 are each provided at their forward ends with an upper shallow throat 41, and a lower relatively deep throat 42 (see Figs. 10 and 11), which throats are adapted to engage the several yarns in such a manner that at the stations where two yarns are provided, one of the yarns will be engaged in the upper throat 41 to form a pile-loop, and the other yarn will be engaged in the lower throat 42 to form a knitting stitch (see Fig. 11). Where only one yarn is provided at a station, said yarn will be engaged by the lower throat 42 to produce a knitting stitch (see Fig. 10).

At the first feed, or course A, only the long butt needles 16 will knit, and the short butt needles 17 will not knit, the single thread being engaged by the deep throat 42 of the sinker 19 and being knitted at odd numbered wales only, and floated as at 43, at even numbered wales to form relatively tight run-resisting sections.

At the second feed, or course B, two yarns are fed into the machine, all of the needles knitting one yarn B1 which is engaged by the lower deep throat 42 of the sinker 19 at each wale, producing a continuous row of stitches in this course. The other yarn B2 at this course will be engaged by the upper shallow throat 41 of the sinker 19 to form a row of pile-loops 44 extending outwardly from the front surface of the fabric.

At the third feed or course C, only the short butt needles 17 will knit, and the long butt needles 16 will not knit, the single yarn engaged by the throat 42 of the sinker 19 being knitted at even numbered wales and floated as at 45 at odd numbered wales to form relatively tight run-resisting sections.

At each of the fourth and fifth feeds or courses D and E, two yarns are fed into the machine, all of the needles knitting one yarn D1 and E1 at each wale, these yarns being engaged by the throats 42 of the sinkers 19, producing a continuous row of stitches in these courses. The other yarns D2 and E2 of each of these courses will be engaged by the shallow throat 41 of each sinker to form a row pile-loops 46 in each of said courses.

At the sixth feed or course F, all of the needles will knit the single yarn at each wale, producing a continuous row of stitches in this course. This single yarn will be engaged by the deep throats 42 of the sinkers 19.

At each of the seventh and eighth courses G and H, two yarns are fed into the machine,— all of the needles knitting one yarn G1 or H1 at each wale, this yarn being engaged by the lower throats 42 of the sinkers 19, producing a continuous row of stitches in these courses. The other thread G2 or H2 of each of these two courses G and H will be engaged by the upper throat 41 of each sinker 19 to form a row of pile-loops in each course.

The above described sequence will be repeated on each succeeding set of eight-feeds or courses as long as the machine continues to operate.

It will be noted by reference to Figs. 2, 3, 4 and 5, that the alternating floats in courses A and C will form run-resisting means for the fabric, and that the rows of pile-loops in courses B, D, E, G and H will form ribs with noticeable "channels" therebetween at the courses A, C and F, whereby a ribbed appearance is provided for the fabric. The rib B has wide channels on each side while the ribs D and E, G and H are arranged in pairs with only narrow channels between the ribs.

It will also be noted that the floats in courses A and C are located on the front or piled surface of the fabric, and that the yarns forming the pile-loops in the courses B, D, E, G and H are interlocked with the adjacent knitting stitches, whereby they will be firmly held in places. By locating the floats and pile-loop yarns in this manner, a relatively smooth back surface is provided for the fabric. Preferably, the front surface of the fabric will be subjected to a napping operation, whereby the fibres will be separated to produce woolly characteristics.

While there has been disclosed in this specification one form in which the invention may be embodied, it is to be understood that this form is shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosure, but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new and for which it is desired to secure Letters Patent, is:

1. A knitted pile fabric consisting of repeating series of courses, each series consisting of at least one course having floats at every odd numbered wale, one course having floats at every even numbered wale, a plurality of courses having pile-loops extending outwardly from one surface of the fabric, and a course without floats or pile-loops.

2. A knitted pile fabric in accordance with claim 1, wherein the floats are on the same side of the fabric as the pile-loops.

3. A knitted pile fabric in accordance with claim 1 wherein the threads forming the pile-loops are interlocked between the adjacent knitted stitches and extend outwardly from the fabric on the same side thereof as the floats are located.

4. A knitted pile fabric consisting of a repeating series of courses, each series including a first course having a single yarn knitted at even numbered wales and floated at odd numbered wales, a second course having two yarns, one being knitted at each wale and the other being formed into a pile-loop, a third course having a single yarn knitted at odd numbered wales and floated at even numbered wales, fourth and fifth courses each having two yarns, one being knitted at each wale of each course and the other being formed into a pile-loop in each course, a sixth course having a single yarn knitted at each wale, and seventh and eighth courses each having two yarns, one being knitted at each wale and the other being formed into a pile-loop at each wale of each course.

5. A knitted pile fabric formed in accordance with claim 4 wherein the floats of the first and third courses are disposed on the front surface of the fabric.

6. A knitted pile fabric formed in accordance with claim 4 wherein the pile-loops extend from the front surface of the fabric, and the yarns forming the same are interlocked with the yarns forming the knitted stitches, and the floats of the first and third courses are on the same side of the fabric as the pile-loops, whereby a relatively smooth back surface will be formed on the fabric.

7. A knitted pile fabric consisting of repeating series of courses, each series consisting of at least one course having floats at every odd numbered wale, one course having floats at every even numbered wale, a plurality of courses having pile-loops extending outwardly from one surface of the fabric, and a course without floats or pile-loops, said fabric being napped on the pile-loop side, whereby a wool-like loose fibrous effect is produced.

8. A knitted pile fabric consisting of a repeating series of courses, each series including a first course having a single yarn knitted at even numbered wales and floated at odd numbered wales, a second course having two yarns, one being knitted at each wale and the other being formed into a pile-loop, a third course having a single thread knitted at odd numbered wales and floated at even numbered wales, fourth and fifth courses each having two yarns, one being knitted at each wale of each course and the other being formed into a pile-loop in each course, a sixth course having a single yarn knitted at each wale, and seventh and eighth courses each having two yarns, one being knitted at each wale and the other being formed into a pile-loop at each wale of each course, said fabric being napped on the pile-loop side, whereby a wool-like loose fibrous effect is produced.

9. A knitted pile fabric consisting of repeating series of courses, each series comprising a first course having a yarn floated at every other wale, a second succeeding course having pile loops of a second yarn at every wale, a third succeeding course having a third yarn floated at every other wale and staggered from the floats of said first course, and a fourth succeeding course having pile loops of a fourth yarn at every wale.

HARRY FLEISHER.

CERTIFICATE OF CORRECTION.

Patent No. 2,124,361. July 19, 1938.

HARRY FLEISHER.

It is hereby certified that error appears in the above numbered patent requiring correction as follows: In the heading to the printed specification, line 8, for "8 Claims" read 9 Claims; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of September, A. D. 1938.

Henry Van Arsdale

Acting Commissioner of Patents.

(Seal)